A SCIENCE & TECHNOLOGY STRATEGY

FOR PRINCE EDWARD ISLAND

1987 AND BEYOND

FOREWORD

I am pleased to present our Government's future plan for science and technology, entitled A Science and Technology Strategy for Prince Edward Island - 1987 and Beyond.

Dramatic changes are occurring in the world economy today; changes which are being brought about by technological innovation, the pace of which has been extremely rapid in the last fifteen years.

New technologies and scientific discoveries are having a major impact on the traditional strengths of our Island economy. Customer countries are becoming increasingly self-sufficient in food production, are able to buy from others at less cost and are substituting new products for our traditional ones. The time has come to consider innovative methods to bolster and sustain our current strengths and to develop new ones.

The best way to protect our interests for the future is to harness new technologies to help us do better what we now do well and learn to do new things which will help sustain and strengthen our economy in the future.

I sincerely believe that this document is one of the first steps in that direction.

Leonce Bernard

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Minister responsible for Science and Technology

A SCIENCE AND TECHNOLOGY STRATEGY FOR PRINCE EDWARD ISLAND

1987

A SCIENCE AND TECHNOLOGY STRATEGY FOR PRINCE EDWARD ISLAND

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INTRODUCTION

Science and technology tend to be thought of as something new, complex, and beyond the understanding of the average person. This is unfortunate. Science and technology refer simply to the acquisition and application of knowledge. The reason the subject has received so much attention in recent years is that the pace of new discoveries, inventions and innovations in virtually all fields of knowledge is accelerating at a very rapid rate. A number of innovative technologies, microelectronics and biotechnology in particular, are making such an impact on the global economy that individuals, governments and societies are compelled to deal with the threats and opportunities they pose.

Prince Edward Island is no exception. It is a province with unique characteristics. Its economy is heavily biased toward farming, fishing and the service industries. It is an Island distant from major markets. It has a small population, small businesses, and limited natural and financial resources. Hence, unique decisions are required on how Prince Edward Island can best use new developments in science and technology to benefit its people and industries. The purpose of this document is to guide these decisions for the medium term. The document draws on a number of recent studies and seminars aimed at identifying ways to diversify the provincial economy. The strategy is the result of a co-operative effort by the federal and provincial governments under the auspices of their June 1984 Memorandum of Understanding on Science and Technology.

I TRANSITION TO AN INFORMATION SOCIETY

The most dramatic change occurring in the world economy today is the transition from traditional "smokestack" industries of the past century to an economy dominated by information intensive enterprises and, in particular, to those whose raw material is knowledge and whose major capital investment is people. Driving this transition is technological innovation, the pace of which has been rapid in the last fifteen years.

Recent advances in INFORMATION TECHNOLOGY enable data to be collected, stored, manipulated, retrieved and presented in an easily understood form and sent instantly to anyone, anywhere, at ever decreasing cost.

Advances in MATERIALS TECHNOLOGY are making it possible to substitute lighter, stronger, more durable and often much less expensive materials for traditional energy intensive manufactured metals.

Advances in BIOTECHNOLOGY are revolutionizing traditional industries in ways unheard of in the past. Biotechnology has developed precise new techniques that use living organisms to make or modify products rapidly, to improve plants and animals and to create micro-organisms for specific uses in areas as diverse as pharmaceutical manufacturing and oil spill cleanups.

Prince Edward Islanders may not fully understand these changes and may have difficulty in blending developing technologies with a rural economy. It may not be readily apparent that new technologies will have an impact or that new methods will be necessary to improve an economy which has been competitive for a long time. The facts, however, show that our export markets are coming under increasing pressure as customer countries become self-sufficient in food production, are able to buy from others at less cost, and are substituting new products. The best way to protect our interests is to harness new technologies to help us do better what we now do well, and learn to do new things which will help sustain and strengthen our economy in the future.

The global transition presents both threats and opportunities for Prince Edward Island. The greatest threat is the competition facing traditional Island products and services. If we continue to believe that our commodities,

either raw or manufactured, can compete in world markets without improvements in quality, variety and price, our economy will encounter serious trouble. Evidence from around the world points to the emergence of products and services in the food industry which have been improved by the application of science and technology to the point where they are now competing aggressively in P.E.I.'s traditional markets.

At the same time, the transition gives P.E.I. a chance to liberate itself from historical constraints upon its economy such as small size, distance from markets and high energy costs, thereby enabling it to attain a greater degree of self-determination. For example,

- new technologies such as microprocessor-controlled flexible manufacturing systems offer the chance to revitalize our traditional food-processing industry by making possible efficient year-round and small-scale production;
- information and communication technologies can enable Island businesses, including primary producers, processors, manufacturers and public and private service sector firms to,

    supply products and services which they were previously unable to produce competitively because they lacked economies of scale;

    manage their operations more effectively and efficiently; and

    maintain closer contact with the markets they serve or wish to capture.

While such developments may result in some labour displacement, demand for new services and whole new categories of work are expected to open up a variety of opportunities to Islanders.

Islanders tend to perceive their strengths as those related to agriculture and the fishery. These traditional strengths, particularly in agriculture, are being threatened by our competitors' ability to react quickly and positively to market trends. Dramatic fluctuations in commodity prices, increased food production and processing capacity in countries that have hitherto been our export markets, and the expanding use of scientific knowledge and technology are eroding the competitiveness of our traditional products. We

must face this reality and plan now if we are to avert a competitive crisis which is possible in the near future.

The time has come to consider innovative methods to bolster and sustain our current strengths and to develop new strengths. Our strong "informal" economy, the capability of many of our underemployed people, our emerging competence in biotechnology and aquaculture and our special relationship with Japan (particularly from a marketing perspective), are just some of the potential strengths we can develop more fully.

II CURRENT STATE OF SCIENCE AND TECHNOLOGY IN PRINCE EDWARD ISLAND

1. Government Sponsored Research and Development

Research and development (R. & D.) activity in Prince Edward Island is minimal compared to that in most other provinces and is funded almost exclusively by the federal government. There is no Provincial Research Organization or any other similar body that represents the public interest in the broad area of science and technology. In 1982 per capita expenditures on R. & D. were $49 compared to the Canadian average of $186. Gross expenditures on research and development in P.E.I. were the lowest in Canada at 0.6% of GDP, compared to 1.2% for the country as a whole and over 2% in most advanced western nations.

Federally funded research is concentrated in agriculture. At the Charlottetown Research Station, Agriculture Canada has developed unique expertise in forages, potatoes and cereal crops, and conducts extensive research in horticulture and soil management which it transfers to the farming community through demonstration projects.

Agriculture Canada's Productivity Enhancement Program (PEP) has accelerated the rate at which new technology has been adopted by P.E.I. farmers. A few of the notable accomplishments are:

- Soybean production has increased from field trials in 1979/80 to commercial production of four thousand acres in 1985. Many hog farmers are now cutting production costs by roasting locally produced soybeans rather than importing Ontario soybean oil meal at $400 per ton.

- The introduction of European technology to the P.E.I. silver fox industry has opened a whole new market for P.E.I. pelts and breeding stock. Contacts for sales in Scandinavia were made under a PEP sponsored tour of fur producing countries.

- Potato producers have demonstrated techniques which have since been successfully adopted to significantly reduce tuber bruising and shrinkage.

In addition, the Market Development Program is assisting the Potato Marketing Board and individual potato producers to access market information through a computer information network. As well, APHIN, an animal health and productivity computerized information network, is a major initiative intended to provide information to producers, veterinarians, and extension workers on disease in individual herds so that appropriate preventative measures and treatments can be employed.

The formal research activity of Fisheries and Oceans is centered on aquaculture, gear development and harvesting, with some research on shellfish carried out at various locations. In the area of aquaculture, mussel growers have developed an innovative technique for harvesting mussels through the ice which prolongs the season. Landings of cultivated mussels have grown from zero in 1976 to over one million pounds in 1985. Long line adaptations, holding tank system research, as well as packaging, container, and equipment development, have also been undertaken by growers and local manufacturers.

Negotiations leading to the signing of a Memorandum of Understanding on aquaculture between Fisheries and Oceans and the provincial Department of Fisheries began in August of 1986.

Science contracts awarded to Island firms by the federal government have accounted for much of the private sector industrial research and development. Principal sponsors have been Energy, Mines and Resources, Fisheries and Oceans, Environment and Agriculture. These contracts have been for small-scale projects in alternative energy sources, energy conservation and management, basic fisheries research, and research in aquaculture, cereals and forages, potatoes, fruit and vegetable crops, and plant and animal diseases.

The Department of Regional Industrial Expansion (D.R.I.E.) has assisted a number of businesses in P.E.I. with projects involving the introduction of new or advanced production processes and products. Since 1980 over $8.7 million has been provided for ninety-seven projects including innovation, modernization, expansion and establishment. As well as direct support for research and development, many capital projects introduced medium to high technologies developed elsewhere which were new to either the province or the firm. The majority of these projects were funded under the Industrial and Regional Development Program and its

predecessors. In addition, D.R.I.E. also supports new product development and marketing under the Canada/Prince Edward Island Marketing Subsidiary Agreement.

The Technology Transfer Division of the National Research Council is active in assisting firms in using current technology in innovative solutions to industrial problems. During 1986-87, almost 100 firms and/or organizations will be assisted through grant programs and a network of technological information. Funding of these firms will total $1 million. Three Industrial Technology Advisors are employed. The accessibility of the I.R.A.P. program is increased through a contribution arrangement with the Holland College Technology Centre. The acquisition of foreign technology is also promoted. Several P.E.I. firms are participating in this program.

The Provincial Government does not carry out scientific research of its own but is active in technology transfer. In the public sector, use of information technology to support provincial and municipal administration is underdeveloped and there is no focal point for information systems planning and acquisition at either the provincial or municipal levels of government. Some work has been done to identify information systems for use in hospital administration. In almost all educational institutions there is room for progress in developing computer literacy.

2. University and College Research and Development

The University of Prince Edward Island has limited facilities for scientific research, but with the arrival of the Atlantic Veterinary College, a new point of departure has been reached for high quality research and development on P.E.I. The Vet College will be a focal point for Island research and development outside of federal laboratories particularly in the areas of fish and animal health. These efforts will bolster the scientific research conducted for the past number of years by a small corp of individuals at U.P.E.I. under special grant programs.

Holland College plays a key role in technical training and would like to expand both its training programs and its instructional materials development in anticipation of the future needs of the workforce. The College has recently established an aquaculture training program and has signed

an agreement with Fisheries and Oceans to use part of the Ellerslie Fisheries Station to implement the program.

3. Private Sector Research and Development

A recent special report on Prince Edward Island's private sector needs for science and technology revealed that a majority of firms are aware of and are now acquiring significant new technology.

Many firms, particularly in manufacturing and food processing, admit difficulty in keeping up-to-date with rapid changes in technology because of the inaccessibility of current information. Many also cite financial reasons, such as lack of capital and insufficient payback, as barriers to innovation. In some cases these reasons reflect a weakness in the skills needed to manage the acquisition and use of technology. There is a good deal of technology modification to suit specific requirements, but the resulting modified products are not normally marketed or diffused to other potential users. A commercial opportunity is, therefore, lost.

Firms in all sectors believe that microelectronics will have more effect on their operations than any other new technology. However, there is little evidence of microelectronics being integrated into current products and processes, in part because the Island lacks a satisfactory base of experience and expertise in computer systems development, installation and maintenance.

The Island has a few small research and development-intensive firms in the field of health sciences, such as those developing the needleless syringe for initial use in the diabetic market, diagnostic chemical kits and fish vaccines. Other firms are working in carageenan extraction processes, and computer imaging technology. Another firm has established a cultured strawberry industry, using tissue culture technology pioneered by the Elite Seed Potato Farm.

Although these firms are a small group of technology leaders and are atypical of the Island, they represent a cadre of new leading-edge Island companies developing innovative products and processes for world markets.

III A SCIENCE AND TECHNOLOGY STRATEGY FOR PRINCE EDWARD ISLAND

Scientific and technical knowledge is not new to most sectors of the Prince Edward Island economy. Over the years applied knowledge has increased productivity in agriculture and the fishery to the point where today there are problems relating to overcapacity. New knowledge must now be directed more vigorously to quality, to new products and markets and to other sectors - manufacturing, education and other services - where adoption of technology has been much slower.

This strategy is based on the conviction that we must increase significantly the pace of current efforts and greatly improve our capacity to use science and technology across all sectors if we are to breathe new life into traditional industries, encourage the establishment of new types of industry in P.E.I. and offset what we have long considered to be our weaknesses.

The following gaps in our current capacity to apply new technology effectively must be addressed:

- Islanders are not sufficiently aware of, nor do they understand, how science and technology can improve their well-being.
- Our schools are not doing as much as they can to direct young people toward scientific, innovative and enterpreneurial futures.
- We do not conduct an adequate level of appropriate basic and applied research.
- In many cases, Island businesses cannot easily access information which will help them keep up with developments in their fields.
- In the manufacturing sector, technology transfer is very modest and business innovation encouraging but limited.
- We are not promoting innovation in the service sector, which contains our largest pool of knowledge workers.

The strategy addresses these gaps and outlines ways to improve the pursuit and adaptation of science and technology in P.E.I.

The goal of this strategy is to ensure that Islanders have access to, and will use, new technologies in a manner that revitalizes traditional industries, creates opportunities for the development of new industries and enhances economic and social well-being.

The strategy calls for a public and private sector effort to:

- increase public awareness and understanding of science and technology;

- promote the transfer, application and development of science and technology within the primary, secondary and service sectors to improve quality, diversity, efficiency and market effectiveness;

- improve the basic infrastructure in education, training, research and information access;

- manage the transition to a more knowledge-based economy.

IV KEY ELEMENTS

1. INCREASE PUBLIC AWARENESS AND UNDERSTANDING OF SCIENCE AND TECHNOLOGY AND ITS POTENTIAL CONTRIBUTION TO THE WELL-BEING OF ISLANDERS.

Main Thrusts

Develop communication programs directed to different target groups, aimed at demonstrating and interpreting ways that new technology can be helpful and profitable.

Developing an awareness and understanding of science and technology and what it can do for our businesses, farms and offices and in our everyday lives is a necessary first step in promoting the use of science and technology to improve the economy as a whole. In the longer term, it is education and experience that will enable Islanders to be innovative and competitive. In the short term progress can be made by making strategic use of available talents and resources.

Many people think of science as something that comes from a laboratory. In their minds it is complex, remote from daily life and difficult to understand. Technology is viewed as sophisticated know-how, and associated with computers, robots and microchips whose functions are beyond the comprehension of lay people.

To overcome this lack of awareness, an expanded and targeted public awareness effort must be launched. It must be directed toward all Island businesses including manufacturers and processors, farmers, those in the fishery, policy makers, teachers, students and the general public. The message must be tailored to the requirements of each group. For example, business people are often well aware of technological developments which are significant to their industry, but need help tracking down up-to-date information which can give them the tools to apply this technology. Existing technology missions and technology transfer programs should be reviewed, gaps filled by new programs and successful ones strengthened.

Policy makers, other government employees, and university and college faculty members will need to become more

directly acquainted with current practices in P.E.I. businesses, farming and fishing operations and with firms leading the application of technology. Support should be available for efforts by industry and commercial associations and other groups to organize seminars, courses and visits on subjects such as technology transfer, and assessment of the cost-effectiveness of new technology. These initiatives will promote a co-operative approach to science and technology development among P.E.I. businesses.

Teachers and students at all levels of the educational system will have to develop a better understanding of how science and technology are, and will be, important to the future of the P.E.I. economy. Particular efforts should be made to motivate young people to understand the potential for gainful employment and business opportunities in science and technology related fields on the Island.

Innovative arrangements can be devised to meet the mutual needs of the educational and business communities. For example, business people from P.E.I. firms using advanced technology could visit classrooms to help students and teachers gain an appreciation of the problems and challenges inherent in acquiring, adapting and using new technologies.

Media campaigns should be mounted and designed to

- help people explore new ideas and experiment with new tools and processes such as micro processors and computers;

- increase the understanding of what can be accomplished with new techniques and technologies by showing Island innovators and entrepreneurs putting them to use in their operations;

- publicize programs and sources of information related to technological innovation on P.E.I.

Industry associations should be encouraged to take an active role in educating their members about science and technology.

2. PROMOTE THE TRANSFER AND APPLICATION OF NEW TECHNOLOGY IN THE PRIMARY, MANUFACTURING AND SERVICE SECTORS TO IMPROVE THE QUALITY, DIVERSITY, EFFICIENCY AND MARKETS OF BUSINESS PRODUCTION.

Main Thrusts:

Encourage primary producers, assisted by the manufacturing and service sectors, to increase the use of technology to create market-responsive and globally competitive products.

Encourage existing business and industry to improve productivity and develop new products and processes through the use of new technologies.

Encourage new business start-ups based on emerging technologies and attract knowledge-based industries to locate in the province, in an effort to to broaden and diversify the industrial base and promote innovation.

Promote the use of information and communication technologies within governments to improve services and decision-making, thereby demonstrating leadership and stimulating the growth of public and private service industries.

These thrusts are based on the belief that we should build on existing strengths and build new strength to achieve growth in our economy. Building on strength means that we intend to do better what we now do well in agriculture, the fishery and food processing by increasing the pace and capability of applying new technology in these sectors. Building new strength means using new technology to do new things and to attract more leading-edge, knowledge-intensive firms to expand the mix of business activity.

The Island's limited financial and human resources dictate:

- that we concentrate on the transfer of technology rather than attempt to build an extensive research and development capability;

- that we focus promotional and research efforts on biotechnology to support agriculture, aquaculture and food processing; and,

- that we attract new industries which use and/or produce advanced technology, make a commitment to train Islanders to work for them, and are likely to generate spin-off industries compatible with Island values.

Technology transfer involves seeking out and applying appropriate new technologies and identifying and attracting new businesses which bring new technologies with them.

The best of the latest equipment and techniques used by firms from around the world should be examined. By adopting best practice technology, producers, manufacturers and service companies have a better chance to bring competitive commodities, goods and services to national and international markets.

A number of Island industries have already developed and adapted leading technologies. Seed potato producers and mussel growers have developed healthy export businesses using the best available technology. Their products are competitive in world markets. Other enterprises such as swine breeding, strawberry production and closed cycle aquaculture are moving quickly in this direction.

A broader commitment is now required. Measures must be identified to promote these methods in all sectors of the economy. In primary industries this means a move toward "seed quality" production in all crop, animal and aquaculture fields. In food processing, the trend should be toward high quality, small-scale processing, aimed at specific market niches. In manufacturing, the objective should be better engineered products of superior design. In the service sector new businesses can apply information and communication technologies to the requirements of producers and manufacturers and also promote the use of these technologies in offices, departments of government and the cultural industries.

Government is in the best position to collaborate with private groups to mount technology demonstration projects in key industry sectors. Projects could be either incremental or comprehensive in nature. The former would demonstrate the application of a new technique to enhance an existing operation. An example would be the addition of a new low-cost, energy-efficient heat exchanger to a grain drying system. The design and construction of pilot demonstration projects using innovative technologies, the results of which

anticipate application to small-scale operations, may be another possibility. Support should be made available for innovative firms which demonstrate a willingness to assume technical and commercial risk. These are the pioneers of the new P.E.I. economy. Specific measures to support these companies could include the provision of incubator facilities for new or expanding firms in the start-up phase.

To provide innovative leadership in the food industry, government will establish a Food Technology Centre dedicated to a search for new markets, new products and new technologies for the food industry.

P.E.I.'s manufacturing sector is, in relative terms, about a third the size of Canada's and is heavily concentrated in food processing. Much of the slow growth which has characterized the Island economy this century is due to the failure to develop a secondary manufacturing sector capable of absorbing workers leaving the land or with specialized educations. A small local market, high transportation costs, lack of indigenous sources of energy and other factors did not make P.E.I. an attractive locale for traditional manufacturing enterprises.

The newer technologies, however, have spawned an increasing number of enterprises where the traditional cost disadvantages are simply not relevant. Products of these technologies are typically low-bulk, high-value, research and intelligence intensive, and aimed at world rather than national markets. Important location factors include proximity to similar businesses, an environment conducive to maintaining a satisfied and stable staff, and a means of permitting the firm to stay abreast of technological developments in its field.

Newer technologies are eroding traditional economies of scale. For example, recent developments in the application of microelectronics to manufacturing have produced "flexible manufacturing systems" which permit rapid line changeovers and cost-effective batch production, allowing small companies to specialize in high quality, small quantity runs at a competitive cost. Computer-assisted production equipment can also consistently produce parts to high tolerance, reduce set-up times, and design, as well as manufacture, components.

The importance of interaction between technology-intensive firms in the same line of work has been demonstrated. There

is an advantage to clustering together to form a core of enterprises which attract more and more companies to the area. Experience has also demonstrated that technology-based firms cluster around learning institutions rather than mass markets. Given P.E.I.'s limited resources in research and development and industrial promotion, it would make good sense to concentrate efforts in those areas where the Island has achieved success and build on existing operations in biotechnology, aquaculture and plant, animal and fish health technologies. The Atlantic Veterinary College will increase significantly the critical mass of technological personnel and is expected to make important contributions in these areas.

The capacity to develop, modify, install, and service electronic systems for industrial use is lacking in P.E.I. Firms have to seek equipment and expertise off-Island. In order to meet present and anticipated future requirements for expansion, the public sector will need to play a significant supporting role in the development of a stronger electronics base.

The use of new technologies within the departments of the Provincial Government should be increased, not only as a cost-effective management strategy but as a way to stimulate and promote the use of appropriate technologies by setting an example. This is not a new idea. Government has been a leader in demonstrating the use of advanced energy technology most notably in centralized wood-chip burning systems that supply heat to a number of distant buildings. This leadership role now needs to be extended to demonstrate government willingness to apply science and technology to the management of government operations.

3. IMPROVE THE BASIC INFRASTRUCTURE IN EDUCATION, TRAINING, RESEARCH AND INFORMATION TO UPGRADE THE CRITICAL SUPPORT REQUIREMENTS FOR THE EFFECTIVE USE AND APPLICATION OF SCIENCE AND TECHNOLOGY.

Main Thrusts

Increase the level of technical skill, management capability and entrepreneurship of the Island work force.

Develop an increased capability in basic and applied research in the vital areas of agriculture, aquaculture and biotechnology.

Improve access to local, regional, national and international information networks.

Knowledge is the new capital in the emerging information society, and talent and energy are necessary prerequisites to all successful ventures in the field of science and technology. To take advantage of new opportunities, P.E.I. will have to develop and retain knowledgeable and creative individuals. This raises questions about how well our school system is equipped to help students develop the technical, managerial and life skills needed to contribute to the development of the P.E.I. economy. In particular;

- Is the present science or technology curriculum relevant to the future needs of P.E.I.'s economy?

- How knowledgeable are the Province's science and math teachers of current developments in science and technology?

There would probably be general consensus that much could be done to improve the school system's capacity to encourage young people and stimulate their interest in pursuing scientific or technological careers. Schools could develop and introduce a broad range of exciting new courses that would use information and communication technologies, simulations and mini-laboratories that would encourage students to pursue creative and rewarding work in the many new and expanding scientific and technical fields.

Model programs involving junior and senior high school students are currently operating in other Canadian regions.

In Dawson Creek, B.C., a pilot program places entrepreneur education in the public school system. A series of courses developed for grades eight to twelve by the superintendent and a local farmer/businessman are integrated with an enterprise centre attached to the school. The courses focus on local economic resources with an emphasis on the environment and the procedures for innovation and starting up a new venture.

The second example is Shad Valley, a successful project in its sixth year, where fifty gifted high school students, sponsored by Canadian hi-tech firms, are chosen to spend their summers at one of three live-in locations at Waterloo, Calgary and UNB. The students work on technical projects, attend lectures by visiting professors and business people and experience a highly stimulating environment designed to help produce creative entrepreneurs.

Our post-secondary institutions should be expected to provide the solid educational and training network and an indigenous research capacity that is essential for new technology to be effectively applied in P.E.I.

Holland College has a good reputation for the quality of its industrial technology training and has many innovative ideas for the future. These ideas should be assessed and, if found to have merit, supported by governments and private concerns.

The University of Prince Edward Island must be encouraged to take a more active role in contributing to the future of the Island's economy. The University's Arts and Science faculties together with the Business School will be called upon to address the need for interdisciplinary courses aimed at producing graduates with the broader base of technical and management skills needed to manage technology-intensive enterprise.

U.P.E.I. and Holland College should be encouraged to develop joint programs, in collaboration with industry, to increase manager's awareness of technology and their capability to use it in everyday operations. Upgrading of skills through a mix of institutional and on-the-job training programs will continue to be given high priority.

Both the University and the College have key roles to play in conducting basic and applied research and in

commercialization of research findings in fields relevant to the province's economic development priorities.

To carry out its role, U.P.E.I. will require support to plan and establish:

- dedicated research facilities for its science faculty;

- a stronger link between university-conducted research and the business and industrial community;

- a greater capacity to ensure that research results from science and Vet College faculties are turned into commercially viable enterprises and services that benefit the Island.

The new faculty and school of Veterinary Medicine at U.P.E.I. will bring to the Island an unprecedented corps of specialists whose work is directly relevant to the primary resource industries. The Vet College will make an important contribution to knowledge, training and industry and significantly influence the climate of scientific and technological efforts in this Province.

Holland College will also require support to market the results of its development programs and in particular its unique instructional technology systems.

Access to current technical information is critical to keeping informed in the rapidly changing world of science and technology. P.E.I. lacks adequate networks to share information that is relevant, timely, meaningful, easy to interpret and readily available. A recent study found that in many instances business people were spending needless time and money looking off-Island for assistance with technical problems because they were unaware of local resources to help them.

An inventory of people with the scientific and technical knowledge to serve as useful members of an Island "innovation network" should be developed and kept up to date. The innovation network will connect people across a range of disciplines for the purpose of exchanging expertise and experience. The inventory will be maintained in digital form for on-line access and ease of updating.

To access technical and business-related information from distant data bases, an "information utility" needs to be established. The utility will allow Islanders to access information stored in electronic form locally and elsewhere in the region, across Canada and abroad, via electronic devices located in regional service centres or their own homes.

4. MANAGE THE TRANSITION TOWARD A MORE TECHNOLOGY BASED ECONOMY IN SUCH A WAY THAT SOCIAL BENEFIT IS ACHIEVED AT MINIMAL SOCIAL COST.

Main Thrusts

Establish a technology organization with authority to promote, co-ordinate and monitor initiatives and projects in science and technology.

There is at the present time no focal point for contact and interaction among people involved in science and technology locally or with other research and technology facilities within the Atlantic Region. Nor is there any focal point from which co-ordination of the various programs and services in support of science and technology efforts can take place. It is essential that a body be established to ensure that all the elements of the strategy are effectively implemented. Such an organization need not have a specific physical location nor a new bureaucracy. It could be a networked organization without walls operating via computer communications networks.

The mandate of such an organization will be to upgrade the transfer, application and development of science and technology across all sectors of the P.E.I. economy.

This is a broad mandate and could include the following responsibilities:

- promote through various means a greater understanding of Science and Technology in P.E.I.;

- provide assistance to P.E.I. businesses, farmers, fisherman and industry associations to acquire, apply and manage technology;

- promote the concept of "best practice technology" and internationally competitive commodities and goods with P.E.I. producers, manufacturers and service sector firms;

- encourage and provide the resources for P.E.I. firms to develop and modify technology for local conditions;

- provide direction and encouragement for greater involvement of P.E.I. schools, colleges and the university in science and technology;

- improve access by firms to local, regional and national R & D facilities and information sources;

- make technology upgrading funds available to P.E.I. firms;

- actively support the growth and development of leading-edge technology firms during their start-up phase.

The organization could operate as a Council, under the chairmanship of the Premier, with representatives from the private and public sectors including all groups with a significant contribution to make to the development of science and technology on P.E.I. The Council should be called upon to interpret the mandate of the organization, to define specific plans for implementing the strategy and keeping it up-to-date, and for monitoring developments in science and technology. The Council would be supported by a secretariat provided by the Provincial Government.

V CONCLUSION

Taking an aggressive approach toward the development and application of science and technology will offer a tremendous opportunity for innovative economic development efforts on P.E.I. It will require, however, that an awareness of science and technology and its impact on P.E.I. permeate all government planning and policy development. It will require strong leadership on behalf of government in collaboration with business, industry and the educational community, and it will require a rethinking of old ways.

The major message of this strategy is that we must quickly take up the opportunity presented by science and technology, to do better what we now do well and to do new things which will help our economy diversify and grow.

APPENDIX A

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APPENDIX B

RECOMMENDED PRIORITY AREAS FOR PROJECT PLANNING

ELEMENT 1

INCREASE PUBLIC AWARENESS AND UNDERSTANDING OF SCIENCE AND TECHNOLOGY AND ITS POTENTIAL CONTRIBUTION TO THE WELL BEING OF ISLANDERS.

PRIORITIES:

Development of a communications strategy to promote public awareness of science and technology.

The Strategy would recommend a broad range of specific projects targeted at the general public and special groups and could include:

- a widely publicized government strategy for science and technology,
- the establishment of joint ventures (business, education, government) to mount ambitious science fairs to display talent and motivate young people toward careers in science and technology,
- the publication of technology newsletters by business organizations for their members,
- the development of television commercials encouraging entrepreneurs by profiling people engaged in innovative ventures.

The foregoing priority places emphasis on developing a public awareness and understanding of the new technologies.

ELEMENT 2

PROMOTE THE TRANSFER AND APPLICATION OF NEW TECHNOLOGY IN THE PRIMARY, MANUFACTURING AND SERVICE SECTORS TO IMPROVE THE QUALITY, DIVERSITY, EFFICIENCY AND MARKETS OF BUSINESS PRODUCTION.

PRIORITIES

Development of Aquaculture Systems.

Development of Animal and Fish Health Technology.

Development of appropriate Automated Manufacturing Systems.

Development of Information and Communication Systems for innovative market research.

Application of microcomputer-based information, communication and decision-support systems in government departments and agencies

Application of technology in cultural industries such as crafts, sound recording, film, video and publishing

The foregoing focuses attention and support on

- the application of biotechnology to increase quality, diversity, price and yield in agriculture, aquaculture and the development of new food products;

- the development and export of energy efficient fish farming systems;

- the use of automation technology in food processing and other manufacturing operations;

- developing a niche in aquaculture research through the collaboration of the Veterinary College, Federal and Provincial governments and local entrepreneurs;

- programs that set an example in the public sector, i.e., the planning and development of electronic systems for promoting and delivering government

services and adjusting provincial government purchasing policies to favour the development and application of new technology.

ELEMENT 3

IMPROVE THE BASIC INFRASTRUCTURE IN EDUCATION, TRAINING, RESEARCH AND INFORMATION TO UPGRADE THE CRITICAL SUPPORT REQUIREMENTS FOR THE EFFECTIVE USE AND APPLICATION OF SCIENCE AND TECHNOLOGY.

PRIORITIES

Development of new entrepreneurial and management education and training programs for prospective and new business people.

Establishment of a university/business liaison office.

Development of computer-based instructional materials and skills-transfer technologies.

Development of innovative science curricula for elementary and secondary levels in association with leading edge entrepreneurs.

Development of interactive computing facilities in the school systems across the Province.

Expansion of research capability at the U.P.E.I. and Holland College.

Development of an "Information Utility" to access local, regional, national and international technical and business information sources.

Development of a low-cost network to link the Regional Services Centres.

Development of an inventory of all forms of government support for science and technology.

The foregoing priorities relate to expanding the Island's capacity to develop, acquire, absorb and apply advanced technology by upgrading education, training, research and information access.

ELEMENT 4

MANAGE THE TRANSITION TOWARD A MORE TECHNOLOGY BASED ECONOMY IN SUCH A WAY THAT SOCIAL BENEFIT IS ACHIEVED AT MINIMAL SOCIAL COST.

PRIORITIES

Establish a Science and Technology Council to promote and co-ordinate initiatives in science and technology in P.E.I.

Appoint a secretariat to support the Council.